CLAIM AMENDMENTS

1. (Currently Amended) A micro-cantilever device comprising:

a base section;

a cantilever section having a length and a tapered width along the length, the cantilever section connected to the base section, the tapered width a function of position along the length and having a minimum width at the base section.

2. (Original) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, and x is a position along the length of the cantilever section.

3. (Original) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax^2$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, and x is a position along the length of the cantilever section.

4. (Currently Amended) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax^3$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, and x is a position along the length of the cantilever section.

5. (Currently Amended) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = w_0[[+]]*exp(ax), wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, and x is a position along the length of the cantilever section.

6. (Currently Amended) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax + bx^2$, wherein w_0 is an initial width of the cantilever section proximate the base section, a is a coefficient, b is a second coefficient and x is a position along the length of the cantilever section.

7. (Currently Amended) The micro-cantilever device of claim 1 wherein the function is defined by tapered width = $w_0 + ax + bx^2 + cx^3$, wherein w_0 is an initial width of the

cantilever section proximate the base section, a is a coefficient, b is a second coefficient, c is a third coefficient, and x is a position along the length of the cantilever section.

8. (Original) The micro-cantilever device of claim 1 further comprising a ground plane below a portion of the cantilever section.

9. (Original) The micro-cantilever device of claim 1 wherein the micro-cantilever has a pull-in voltage that is calculated as function of dimensions of the cantilever section and material properties of the cantilever section.

10. (Currently Amended) The micro-cantilever device of claim 9 wherein the function is substantially defined by $V_{PI} = 1.5X10^{-12} a^{-0.2009} L^{-2.1899} w_0^{0.2166} \sqrt{E}$, wherein V_{PI} is the pull-in voltage, a is a slope of the tapered width, L is the length, and E is the Young's modulus.

11. (Currently Amended) The micro-cantilever device of claim 9 wherein the function is substantially defined by $V_{PI} = 3.2626X10^{-13} a^{(-0.3385+76.4667L)} L^{-2.8044} w_0^{0.3219} \sqrt{E}$, wherein V_{PI} is the pull-in voltage, a is a taper coefficient, L is the length, and E is the Young's modulus.

12. (Currently Amended) The micro-cantilever device of claim 9 wherein the function is substantially defined by $V_{PI} = 1.0021x10^{-11} \sqrt{E} L^{-1.7868} \exp[a(1.01469x10^{-5} - 0.4221L)]$, wherein V_{PI} is the pull-in voltage, a is a taper coefficient, L is the length, and E is the Young's modulus.

13. (Original) The micro-cantilever device of claim 9 wherein the function is derived by performing the steps of:

determining a geometry of the micro-cantilever device;

determining a plurality of pull-in voltages for at least one length of the micro-cantilever device; and

fitting a pull-in voltage formula to the plurality of pull-in voltages based upon the geometry of the micro-cantilever device.

14. (Original) The micro-cantilever device of claim 13 further comprising the step of assuming a form of the pull-in voltage formula.

15. (Currently Amended) The micro-cantilever device of claim 14 wherein the form of the pull-in voltage is $V_{PI} = ka^x w_0^y L^z$ if the micro-cantilever device has one of a linear tapered width and a parabolic tapered width, wherein V_{PI} is the pull-in voltage, k is a constant, a is a slope of the tapered width, and L is the length.

16. (Currently Amended) The micro-cantilever device of claim 14 wherein the form of the pull-in voltage is $V_{PI} = ke^{\alpha x} L^y$ if the micro-cantilever device has an exponential tapered width, wherein V_{PI} is the pull-in voltage, k is a constant, a is a taper coefficient, and L is the length.

17. (Original) The micro-cantilever device of claim 1 wherein the cantilever section has at least one open window.

18. (Original) The micro-cantilever device of claim 17 wherein the micro-cantilever device has an axis about which the micro-cantilever device is symmetrical and wherein the at least one open window is located on the axis.

19. (Original) The micro-cantilever device of claim 1 further comprising a second base section and wherein the cantilever section is attached to the second base section.

20. (Original) The micro-cantilever device of claim 19 further comprising a ground plane located below the cantilever section.

21. (Original) The micro-cantilever device of claim 19 wherein the cantilever section has at least one open window.

22. (Original) The micro-cantilever device of claim 19 further comprising a strain relief at at least one of the base section and second base section.

23. (Original) The micro-cantilever device of claim 19 wherein the cantilever section includes a lateral stress relief.

24. (Original) The micro-cantilever device of claim 1 wherein the micro-cantilever device is manufactured using a Multi-User Micro-Electro-Mechanical Systems Process.

25. (Original) The micro-cantilever device of claim 1 wherein the tapered width is a function of position along the length and one of a sinusoidal function, a stepped function, and a trapezoidal function.

26. (Original) A method to determine a pull-in voltage formula comprising the steps of:

determining a geometry of the micro-cantilever device;

determining a plurality of pull-in voltages for a plurality of lengths of the micro-cantilever device; and

fitting a pull-in voltage formula to the plurality of pull-in voltages based upon the geometry of the micro-cantilever device.

27. (Original) The micro-cantilever device of claim 26 further comprising the step of assuming a form of the pull-in voltage formula.

28. (Currently Amended) The micro-cantilever device of claim 27 wherein the form of the pull-in voltage is $V_{PI} = ka^x w_0^y L^z$ if the micro-cantilever device has one of a linear tapered width and a parabolic tapered width, wherein V_{PI} is the pull-in voltage, *k* is a constant, a is a slope of the tapered width, and *L* is the length.

29. (Currently Amended) The micro-cantilever device of claim 27 wherein the form of the pull-in voltage is $V_{PI} = ke^{ax} L^y$ if the micro-cantilever device has an exponential tapered width, wherein V_{PI} is the pull-in voltage, *k* is a constant, a is a taper coefficient, and *L* is the length.

30. (Original) The method of claim 26 wherein the step of determining a plurality of pull-in voltages for a plurality of lengths of the micro-cantilever device comprises the steps of:

a) iteratively solving a displacement vector as a function of applied voltage across the micro-cantilever device;

b) determining a voltage at which a solution of the displacement vector does not converge;

c) setting a pull-in voltage to the voltage at which the solution did not converge; and

d) repeating steps a-c for a number of slope constants.

31. (Original) The method of claim 30 further comprising the step of repeating steps a-d for each length.

AMENDMENTS TO THE DRAWINGS

The attached sheets include changes to Figs. 2-4, 9a, 9b, and new Fig. 9c. The changes to Figs. 2-4, 9a, and 9b are to change the figures from photographs to drawings. Fig. 9c has been added to clearly show the strain relief as required by the Examiner and as can be seen in the revised figures.

Attachment: Replacement Sheet(s)